

# Allen Bradley PLC OL-470 Series Service Manual



 **HydReclaim®**

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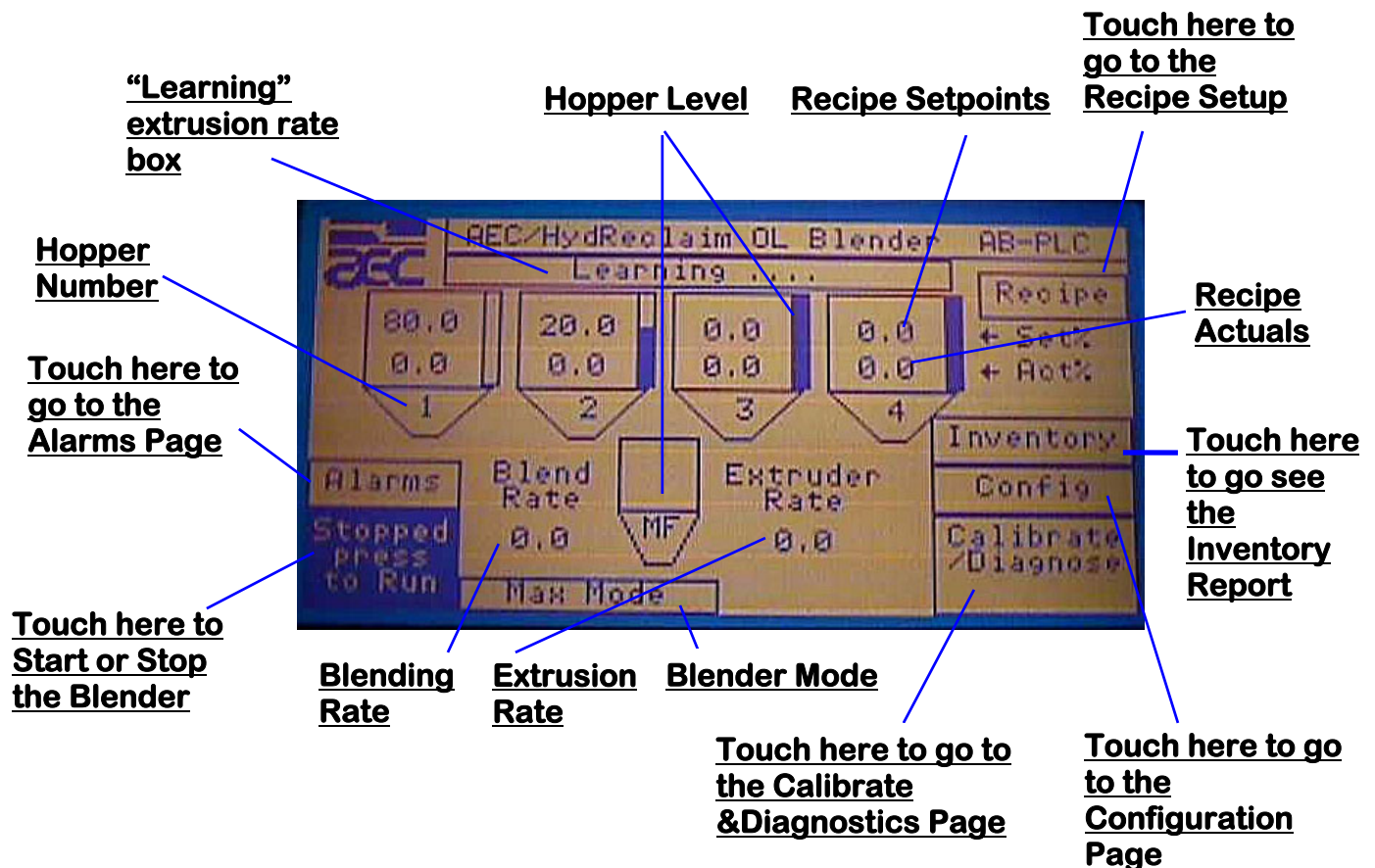
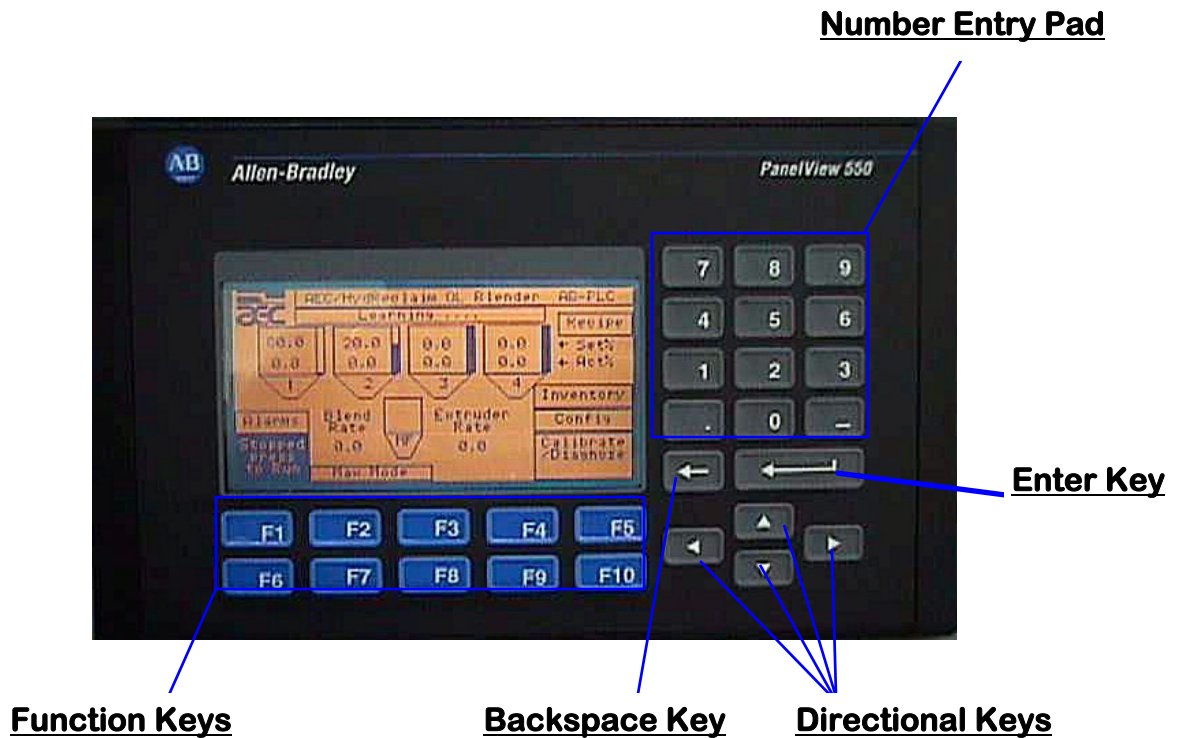
##### ACS Warsaw

Ul. Działkowa 115  
02-234 Warszawa  
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Fax: +48 22 390 9724

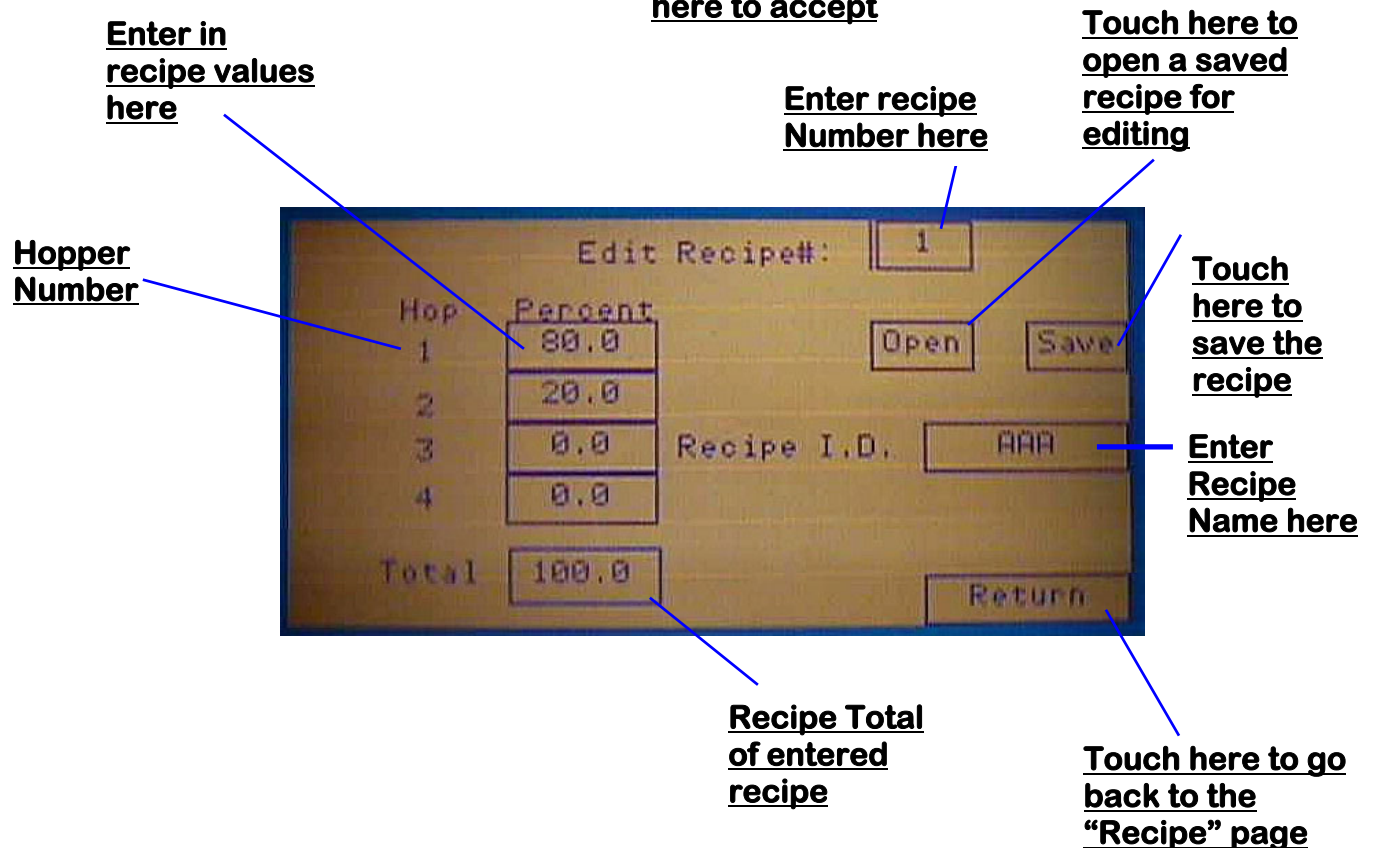
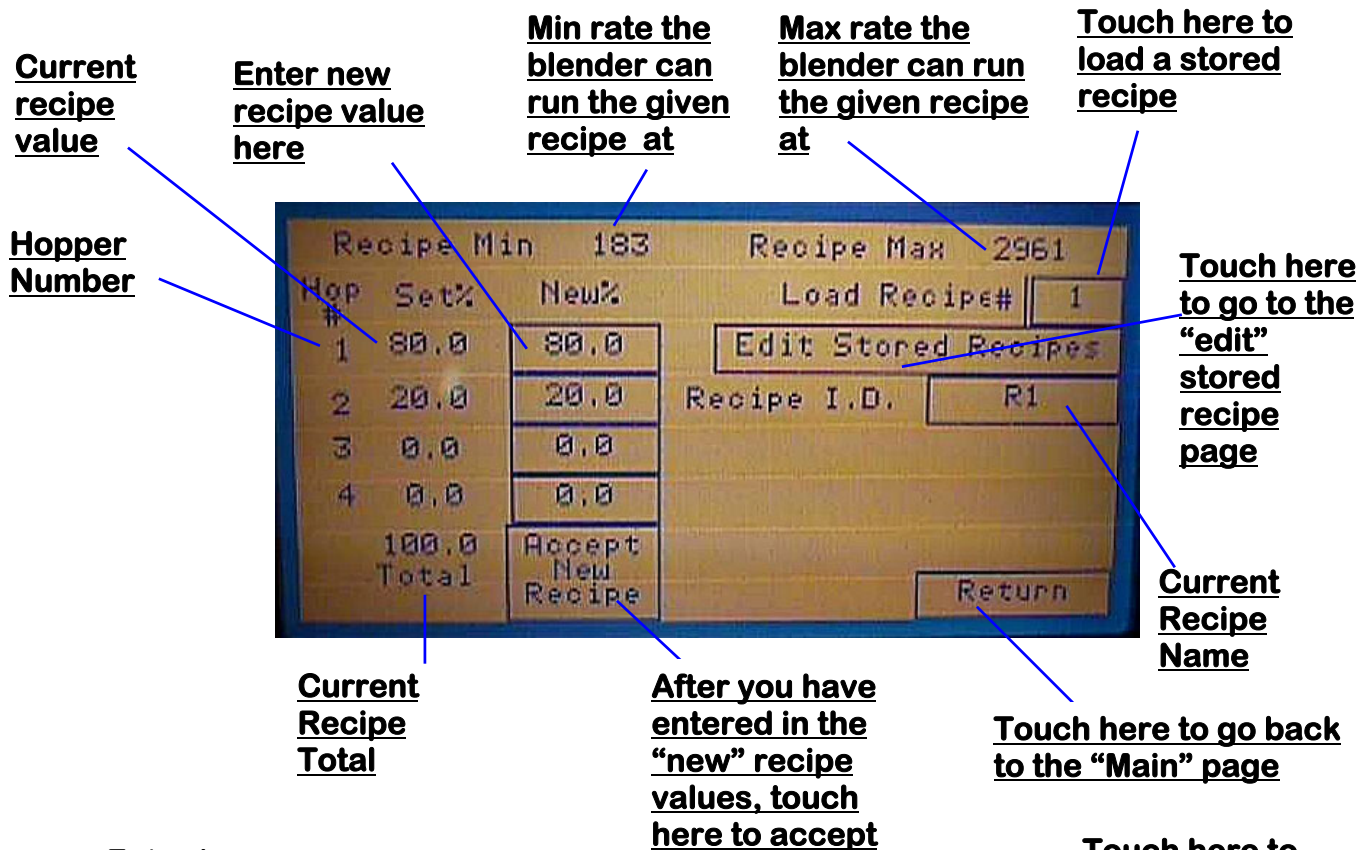
#### India

##### ACS India

Gat No. 191/1, Sandbhor Complex  
Mhalunge, Chakan, Tal Khed,  
Dist. Pune 410501, India  
Phone: +91 21 35329112  
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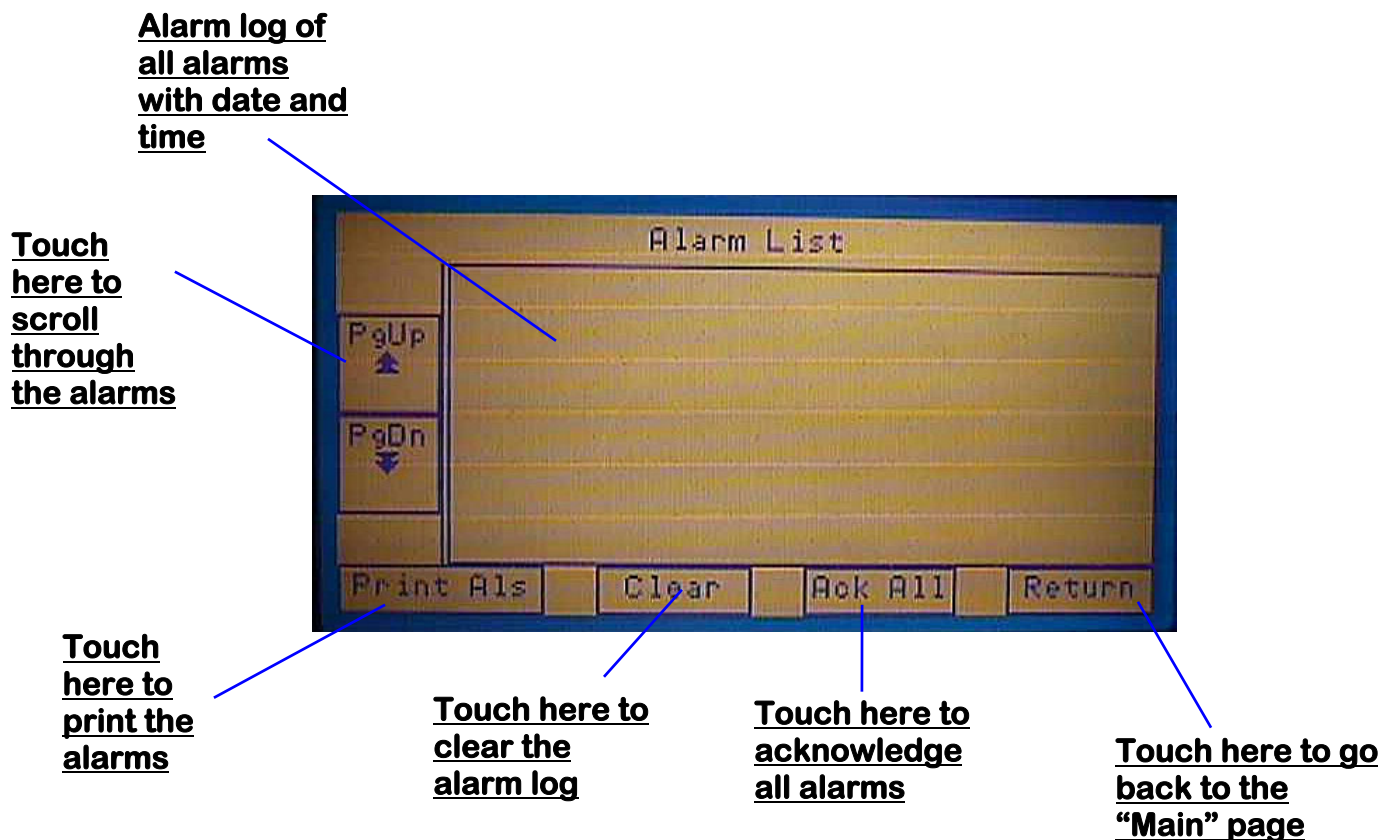
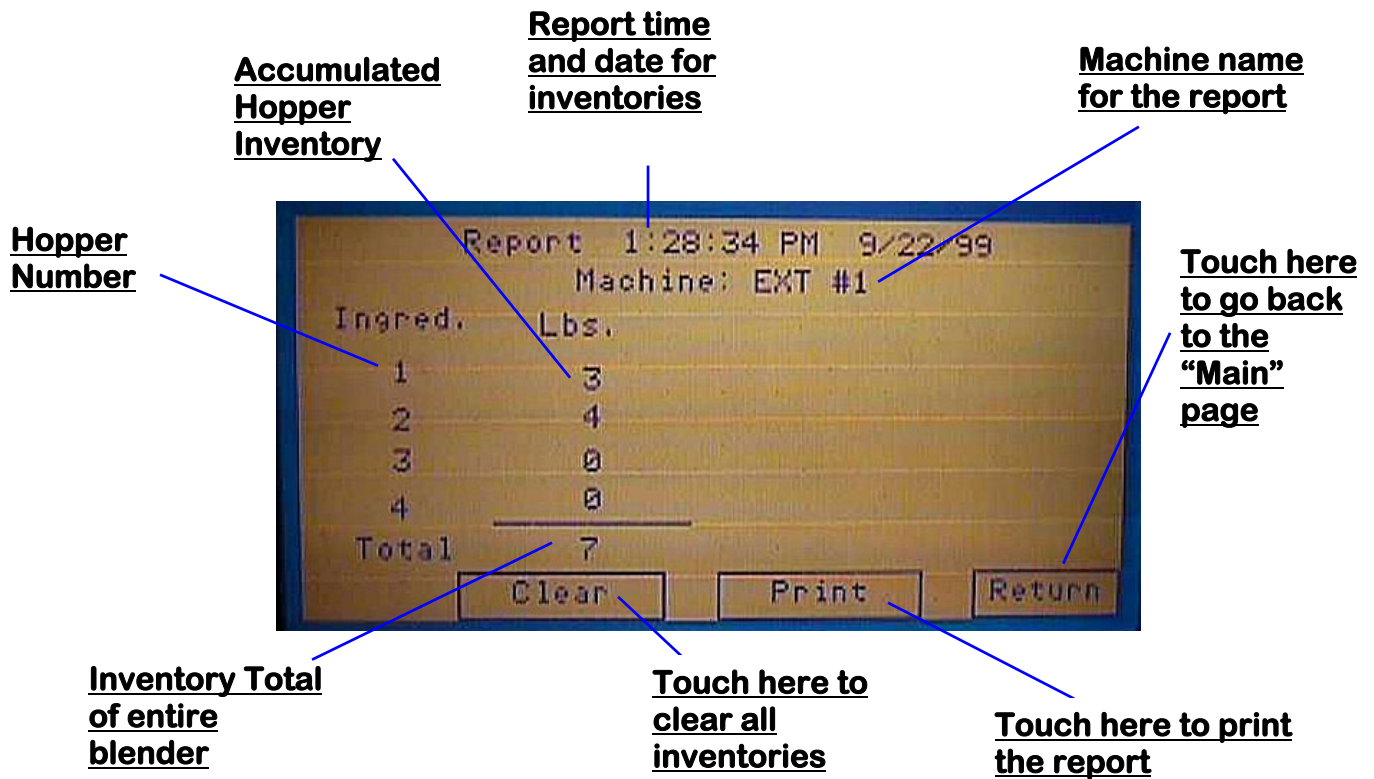


## The “Recipe” and “Edit Recipe” Pages





## The “Inventory Report” and “Alarms” Pages



# The “Blender Configuration” Pages

**Enter in the Hopper size**

**Enter the weight at which the hopper should reload at**

**Enter in the sample size for the weight per count learning**

**Hopper Number**

Hopper Number	Hopper Max Lbs.	Reload Lbs.	Learn Lbs.
1	30.0	15.0	5.0
2	5.0	2.5	1.0
3	5.0	1.0	1.0
4	1.5	0.5	0.5

**Touch here to go to the Panel View Configuration**

**Touch here to go to “Setup Page 2”**

**Touch here to go back to the “Main” page**

**Enter in the Mass Flow hopper zones**

**Touch here to go back to “Setup Page 1”**

**Touch here to go to “Setup Page 3”**

**Touch here to go back to the “Main” page**

Mass Flow Zones	Setup Page 2
6.0	Full
5.0	Adj.D
4.0	Steady.U
3.0	Steady.L
2.0	Adj.U
1.0	Empty

## The “Blender Configuration” Pages

**Touch here to either enable or disable the extruder RPM voltage feedback**

**Enable or disable the “Auto Start” feature**

**Select English or Metric units**

**Enter the machine name for the Inventory Report**

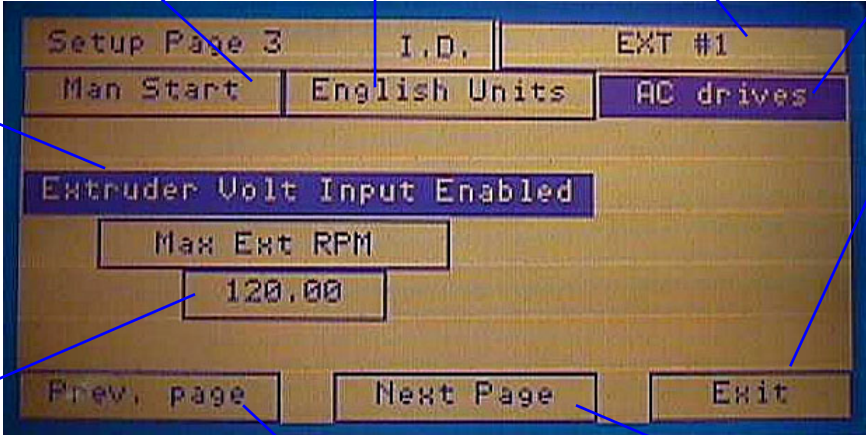
**Touch here to specify either AC or DC Drives**

**Touch here to go back to the “Main” page**

**Enter the maximum extruder RPM at 10Volts reference**

**Touch here to go back to “Setup Page 2”**

**Touch here to go to “Setup Page 4”**



Setup Page 3

Man Start	I.D.	EXT #1
English Units		AC drives
Extruder Volt Input Enabled		
Max Ext RPM		
120.00		
Prev. page	Next Page	Exit

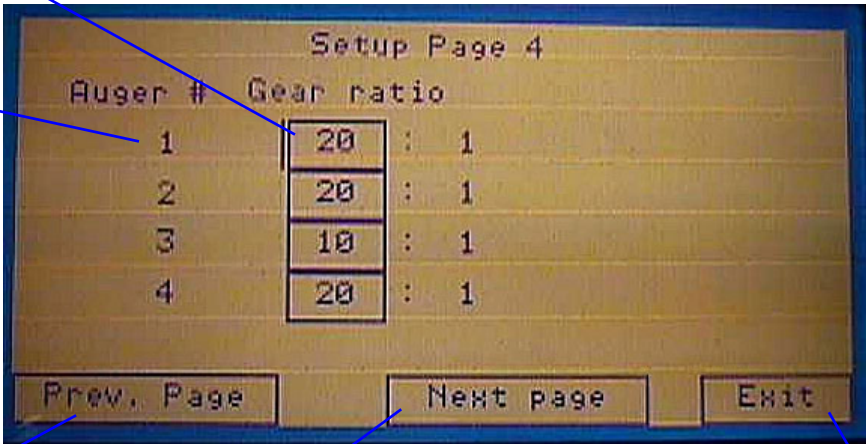
**Enter in the gearbox ratio for each hopper**

**Hopper Number**

**Touch here to go back to “Setup Page 3”**

**Touch here to go back to “Setup Page 5”**

**Touch here to go back to the “Main” page**



Setup Page 4

Auger #	Gear ratio
1	20 : 1
2	20 : 1
3	10 : 1
4	20 : 1

Prev. Page    Next page    Exit



## The “Blender Configuration” Pages

Enable or  
disable the  
“Shutdown”  
procedure for  
the given  
alarm

Alarm  
Name

Setup Page 5			
Select Alarm Shut Down conditions			
No Flow S/D	<input type="button" value="N"/>	Can't Achieve High Rate	<input type="button" value="N"/>
Reload Too Long	<input type="button" value="N"/>	Can't Achieve Low Rate	<input type="button" value="N"/>
LoadCell Fail	<input type="button" value="N"/>	Motor Failure	<input type="button" value="N"/>
Soale Capacity	<input type="button" value="N"/>		

Define User Password

Prev. Page	<input type="text" value="0"/>	Exit
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Touch here to  
go back to  
“Setup Page 4”

Enter in the “Calibrate  
and Diagnostics”  
access password. “0”  
disables this function.

Touch here to go back  
to the “Main” page



# The “Diagnostics” Pages

Touch here to go to the “Auger Calibration” page

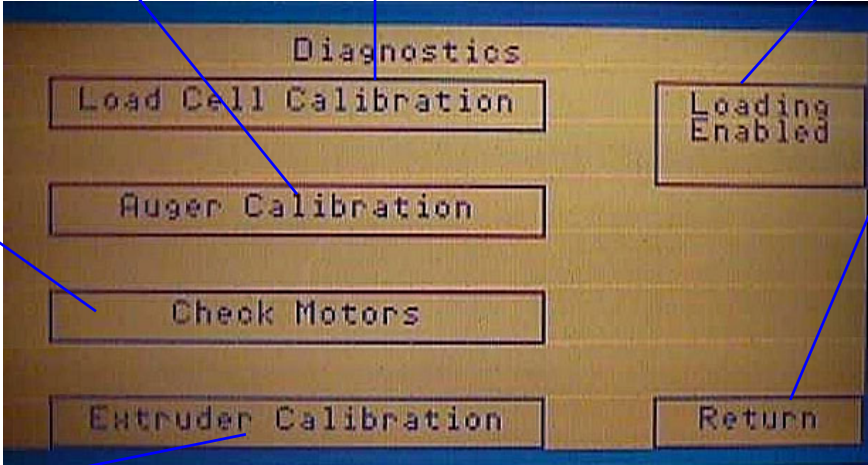
Touch here to go to the “Load Cell” calibration page

Disable or Enable the loading of the hoppers

Touch here to go to the “Check Motors” page

Touch here to go back to the “Main” page

Touch here to go to the “Extruder Calibration” page



The screenshot shows a menu titled "Diagnostics" with the following options: "Load Cell Calibration", "Auger Calibration", "Check Motors", "Extruder Calibration", "Loading Enabled", and "Return". Blue lines connect the callout text to the corresponding menu items.

Hopper Number

Enter the calibration weight size.

Touch here once you have emptied the hopper

Touch here after you place the test weight on the hopper

Touch here to go back to the “Diagnostics Main” page

Load Cell Calibration in Lbs.

Hopper #	Cal. Wt.	Set Empty	Set Cal Wt	Wt. Reading
1	6.08	Set	Set	0.00
2	6.08	Set	Set	3.16
3	2.09	Set	Set	6.18
4	2.09	Set	Set	2.65
M.F.	2.09	Set	Set	0.01

Return

## The “Diagnostics” Pages

**Instructions**

**Accumulated Hopper Inventory**

**Enter in the hopper number**

**Calculated max rate for auger**

**Enter in the calibration sample size**

**Enter in the calibration speed**

**Calculated min rate for auger**

**Accumulated Weight for calibration**

**Touch here to begin the calibration**

**Touch here to abort the calibration**

**Touch here to go back to the “Diagnostics Main” page**

Auger Calibration

Feeder #: 1

Cal Wt: 5.00

Cal Spd: 900

Current Wt: 0.00

Range: 146.2 to 2778.3

Push Start to Begin

Start Abort Return

**Enter the speed from 0-100 percent for the auger**

**Hopper Number**

**Touch here to change the mode from “Normal” to “Test”**

**Instructions**

**Touch here to go back to the “Diagnostics Main” page**

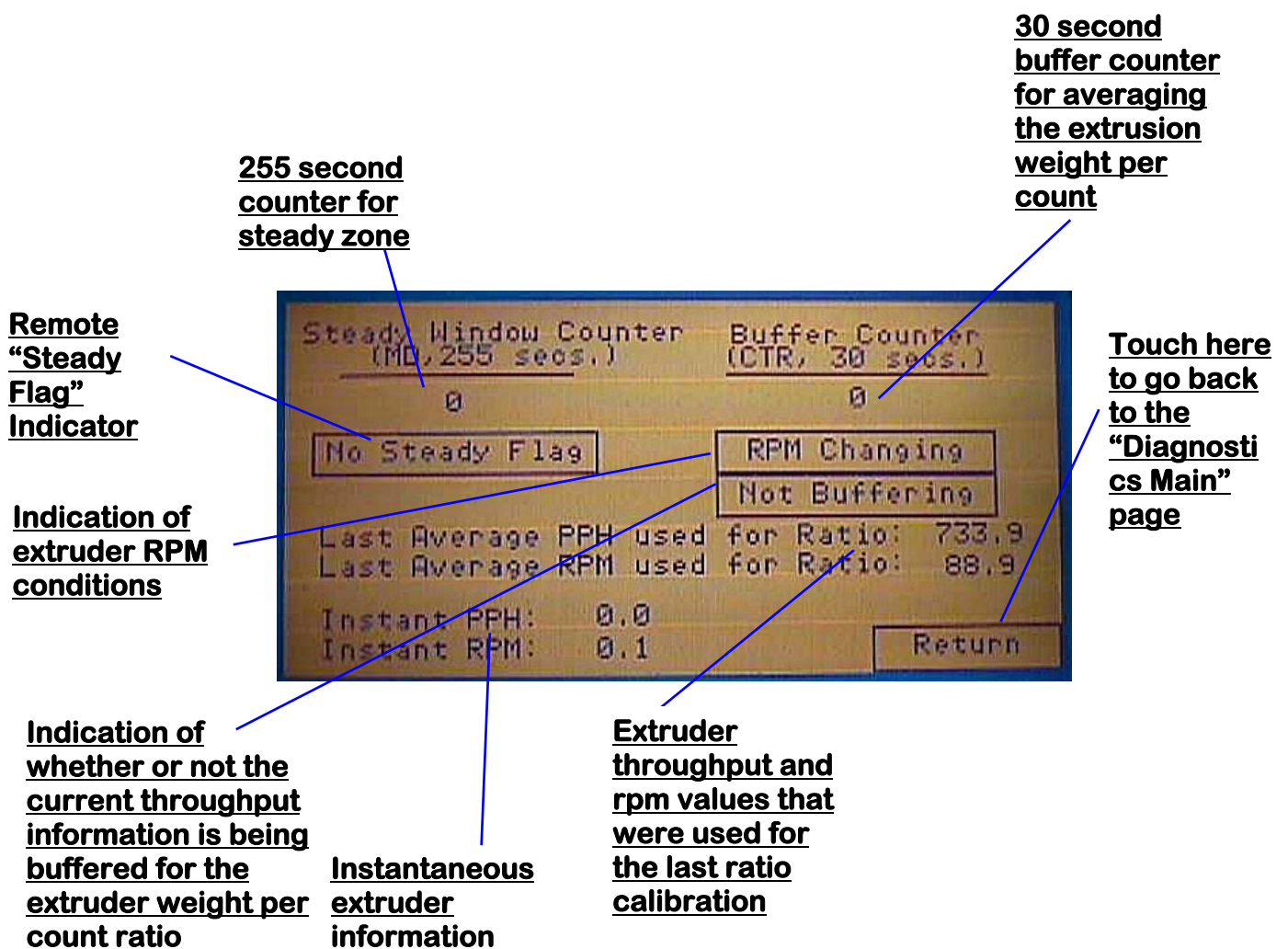
Feeders

Feeder	Set %	Speed	Mode
1	0	0	Normal
2	0	0	Normal
3	0	0	Normal
4	0	0	Normal

Change the Mode to "Test" before entering speeds

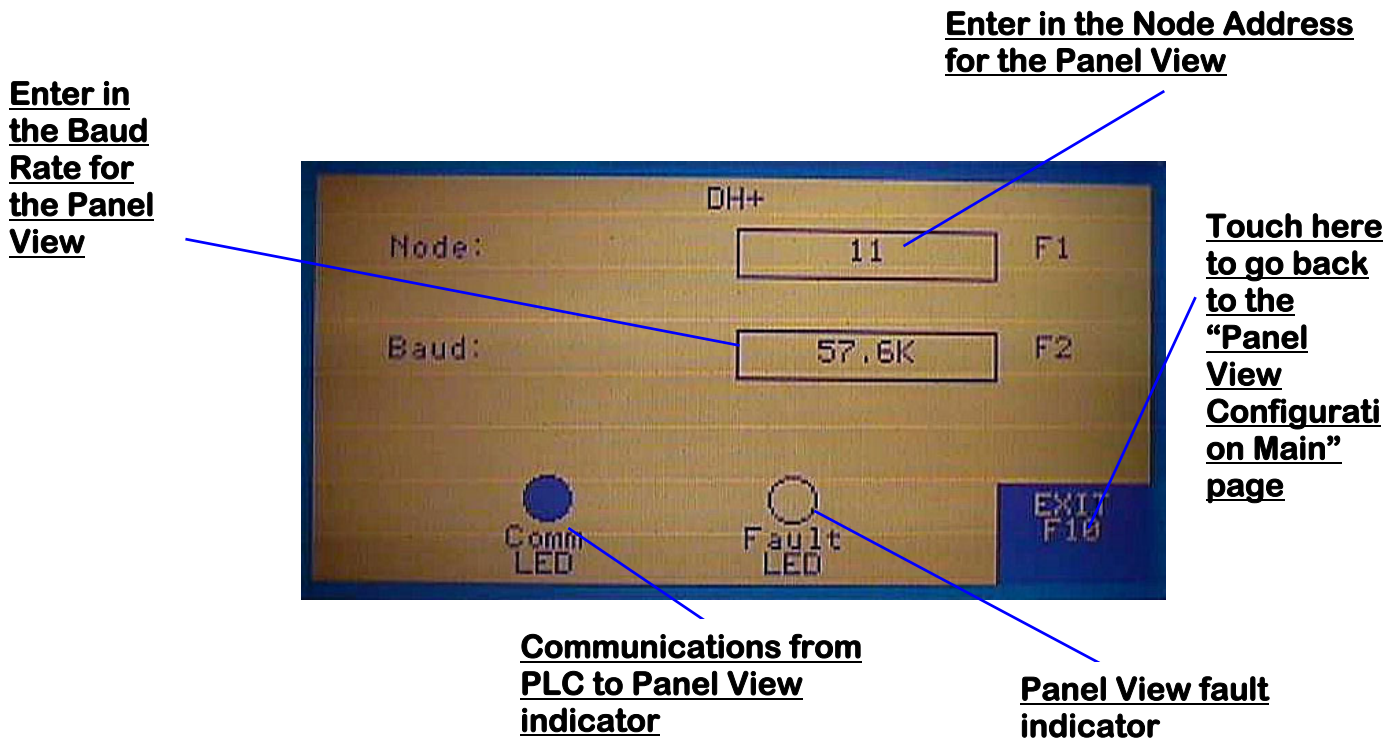
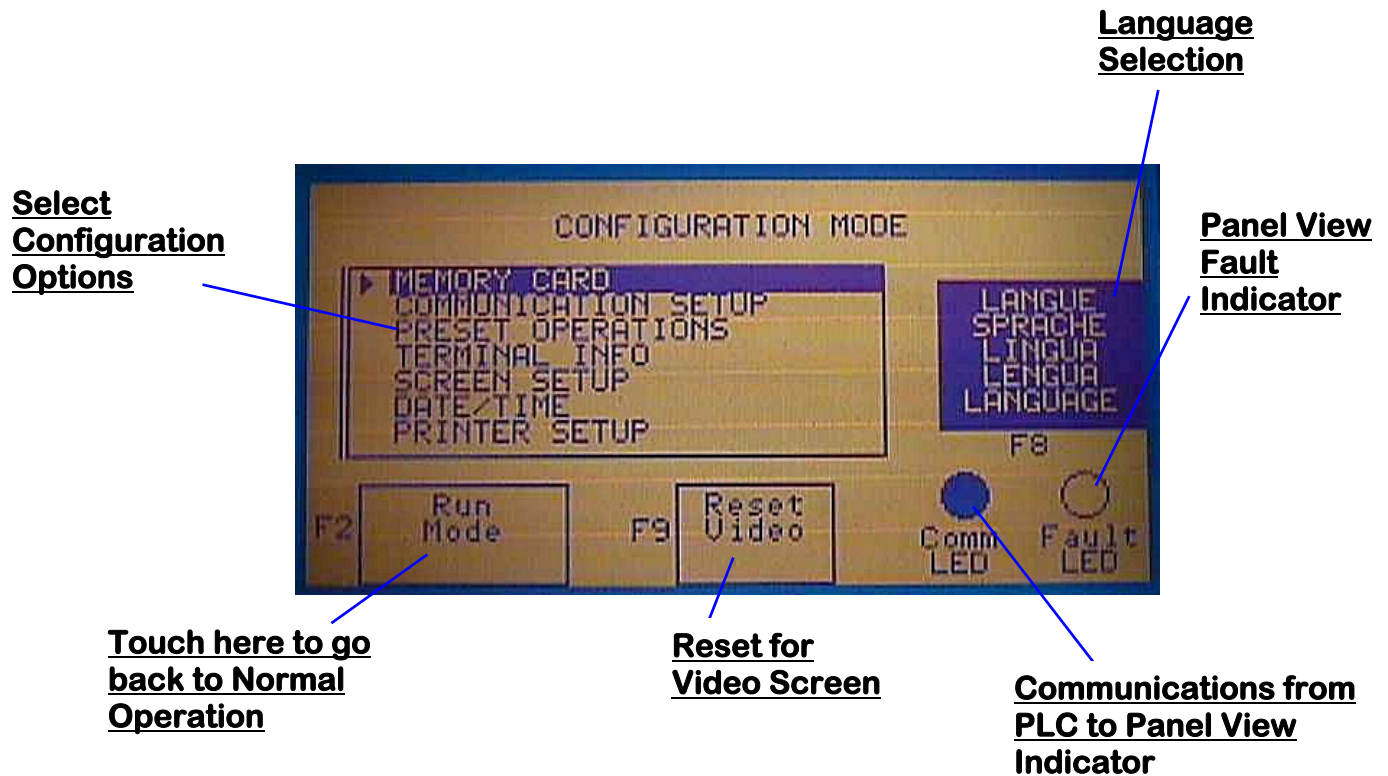
Return

## The “Diagnostics” Pages

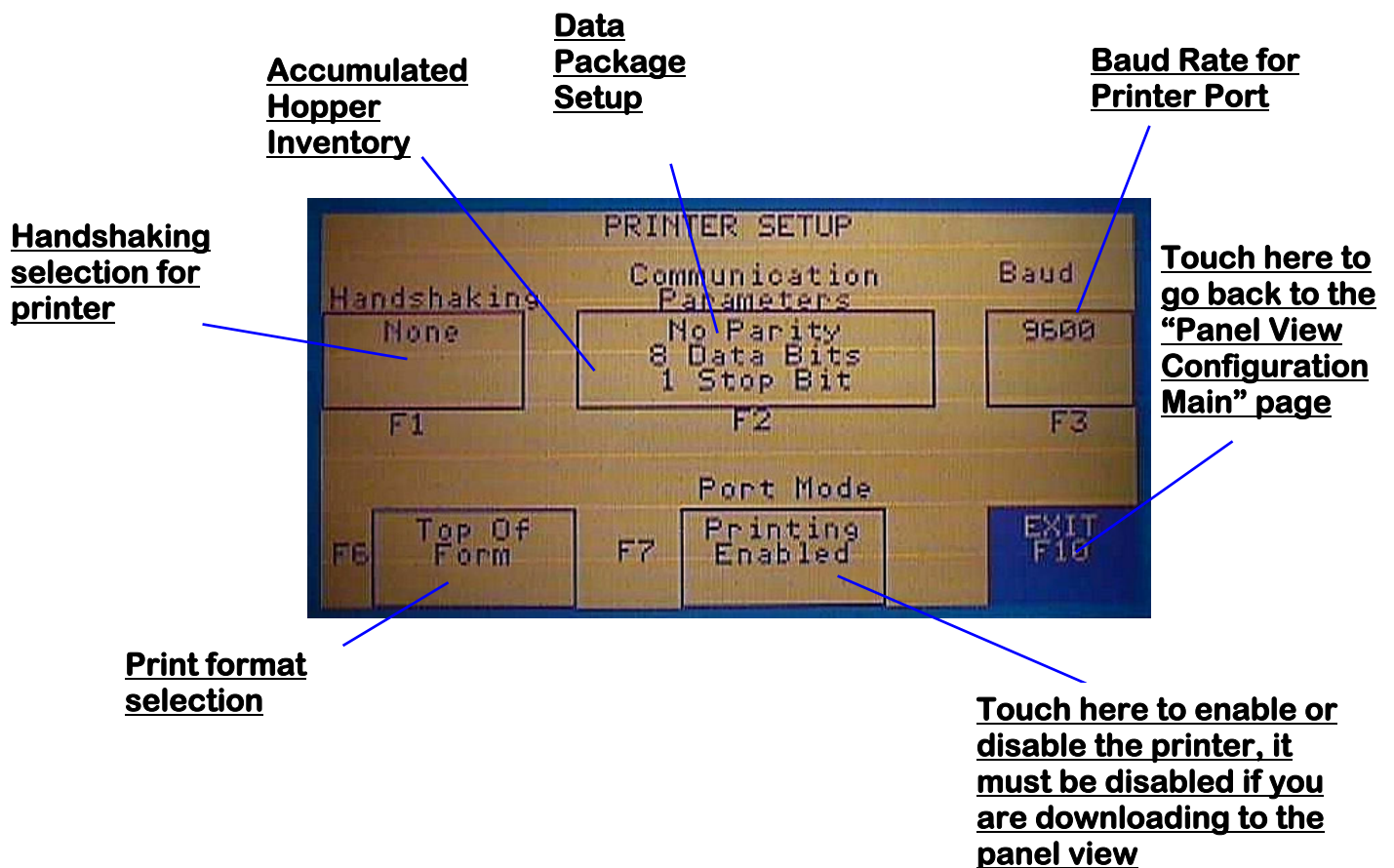




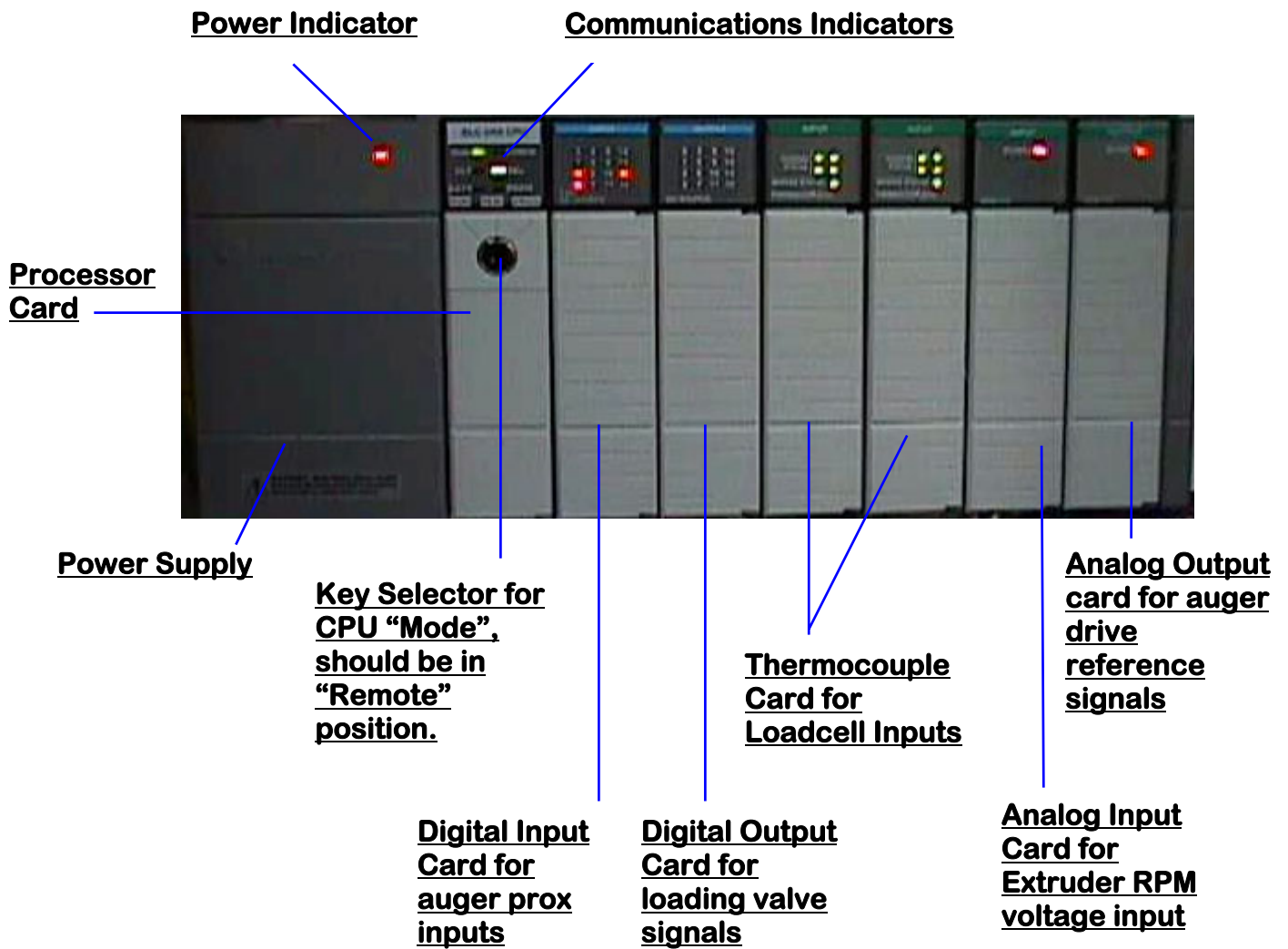
## The “Panel View Configuration” Pages



## The “Panel View Configuration” Page



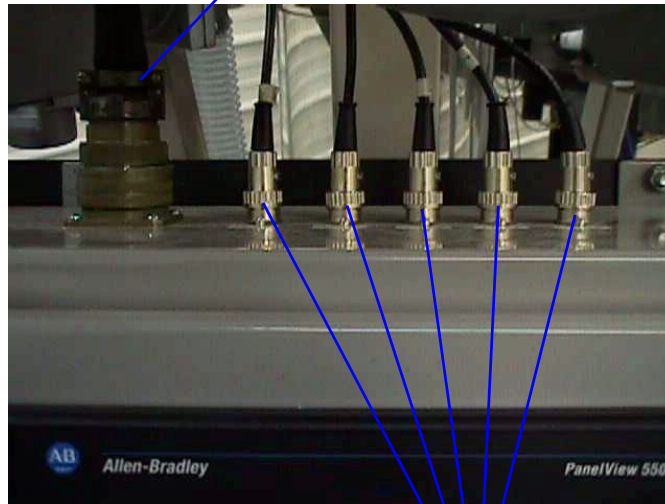
## The SLC500 Cards



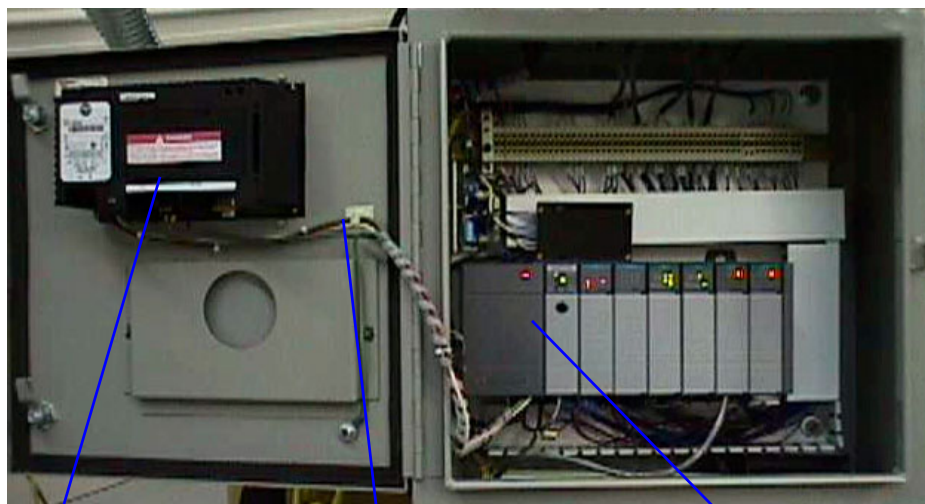


# The Panel connections

## Connector to Blender Drive Panel



Loadcell  
connectors



Panel View 550

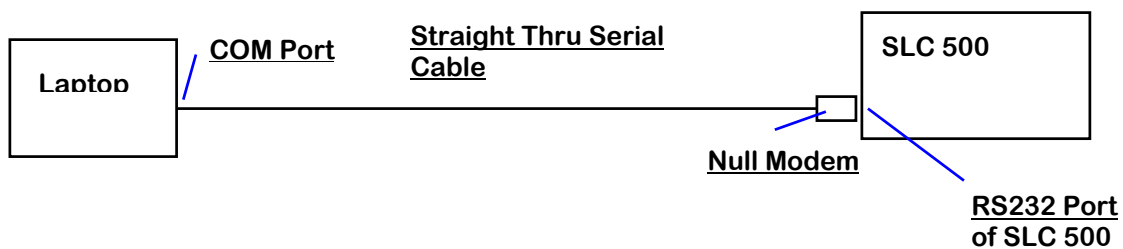
Panel View  
Communications (DF1)  
and Power Cable

SLC 500  
5/04 64k

# Downloading and Uploading to the SLC 500 PLC

**Tools Needed:** laptop or PC with “Rockwell Automation/ RSLogix 500” installed and activated. When activating after you have installed the RSLogix 500 software you will need to insert the “Token” disk that comes with the RSLogix 500 software. This disk is “backed-up” on the server using a program called “WINDUPE”. The disk can only be used on one computer (single license). For more information on installation see the RSLogix 500 software package.

You will also need a standard straight thru serial cable (DB9 on each end) and a “Null” modem converter that will plug into the cable and then to the SLC 500. The “Null” modem converter can be made by getting 2 DB9 connectors and soldering pins 5-5, 2-3, and 3-2.



## Downloading and Uploading Steps

**Step 1:** The first step is that you have to setup the communications drivers for RSLinx. From the laptop run “Rockwell Software/RSLinx/RSLinx”. Then go under “Communications”, then go to “Configure Drivers”. Delete all drivers listed under “Configured Drivers” by highlighting the driver listed and then clicking “Delete” (you will not be able to delete a “virtual” link driver). Now select “RS-232 DF1 Devices” under “Available Drivers” and click “Add”. When the configuration screen appears click “Auto Configure”, this will look for the SLC 500 through the cable link and will automatically configure the driver. In the future if you change the Node Address of the SLC 500 you will need to go back to this page and re-click the “Auto Configure” button. You can get to this page by double-clicking the “RS-232 driver” listed under “Configured Drivers”. Once the “Auto Configure” has been successfully completed then you will be able to upload and download to the SLC 500. Remember to leave the RSLinx running.

**Step 2:** The first step whenever you are working with a SLC 500 that does have a program in it (at a customer’s site) is to upload and save the program that is currently in the SLC 500. That way you can download this original program back to the SLC 500 in case of a problem with the new software you intend to download. Before proceeding be sure to go to the panel view and write down all of the configuration settings so that you can reprogram the unit when you are done downloading. If prompted for a password on the panel view, we use 2 passwords, “5413” and “3145348”.

To upload the existing program from the customer’s SLC 500 to your laptop first run “Rockwell Software/RSLogix 500/RSLogix 500”. Once the program is running go under “Comms” and select “Upload”. Follow the instructions. Once the upload is complete go under “File” and save the project into a directory that you have made in WIN95.

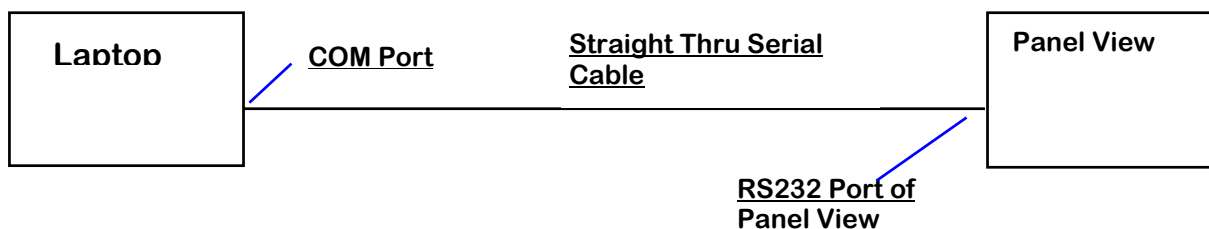
## Downloading and Uploading to the SLC 500 PLC

**Step 3:** Whenever you are ready to download the new software, close the files that you currently have on the RSLogix 500 program and then open the new files from wherever you have stored them. You always want to open the file named “blend\_4.RSS” or “blend\_8.RSS” found under “PLC Projects/AB OL Software/Standard”. Once the new program is open, go under “Comms” and select “Download”. Follow the instructions. After the program downloads you will be prompted “Put the PLC back into “RUN” mode”, answer yes to this. This completes downloading and uploading to the SLC 500. Be sure to reconfigure the SLC 500 blender setup parameters using the SLC 500. Then recalibrate the load cells, and run an “auger calibration” for each hopper.

## Downloading and Uploading to the Panel View

**Tools Needed:** Laptop with both RSLogix installed as described before and “Panel Builder” installed. Panel Builder software does not use a “Token” disk to protect against multiple installations (however you are legally only allowed to install this software to one computer). For more information on installation see the Panel Builder software package.

You will also need one standard straight thru serial cable to connect between the com port on the laptop and the RS-232 port of the Panel View.



**Step 1:** The first step is that you have to setup the communications drivers for RSLinx. From the laptop run “Rockwell Software/RSLinx/RSLinx”. Then go under “Communications”, then go to “Configure Drivers”. Delete all drivers listed under “Configured Drivers” by highlighting the driver listed and the clicking “Delete” (you will not be able to delete a “virtual” link driver). The Panel Builder software uses it’s own DF1 driver and therefore you cannot have any drivers configured under the RSLinx software or it won’t work. Be sure though to leave the RSLinx software running.

**Step 2:** The Panel View software program for the Allen Bradley OL-470 has the printer port enabled in the software. This allows the customer to print reports from this port. However, whenever you are uploading or downloading you must use this port for communications and not printing. To set this up you will need to go to the “Panel View Configuration” page, then “Printer Setup”, and then disable the printer port under “Port Mode”. Once you have done this touch “Exit” and the touch “Run Mode” (this places the Panel View back into normal operation mode). To get to the “Panel View Configuration” page go to the Panel View and hold both the left and right arrows on the keypad. This will bring up the configuration page for the Panel View System.



## Downloading and Uploading to the Panel View

**Step 3:** If the existing Panel View already is running software (customer's site), then you will first need to upload and save this to a directory of your choice. That way if you have any problems with the new software then you will be able to download the old software back into the unit. If you are only changing the Panel View software and not the SLC 500 software then you do not have to right down all of the "Setup" parameters for the blender. These parameters will automatically be loaded into the panel view from the SLC 500 once you have completed the download. To upload the existing software from the panel view to your laptop first run "Panel Builder/Panel Builder". Do not run the "Application file Transfer Utility!!!!". Once Panel Builder is running go to "Application" and select "Upload". When the upload is complete save the file onto the laptop into the directory of your choice. Typically label it "Onsite "date"" and name the folder the customer's name. After this is done you will be ready to download the new software to the panel view.

**Step 4:** Close any files that are currently open in panel builder and then open the new software file ("4\_comp.pba" or "8\_comp.pba", that is found under "PLC Projects/AB-OL Software/Standard"). **WHENEVER PROMPTED SELECT "REPLACE ALL" AND "ADD ALL"**. Once the file is open then go under "Applications" and select "Download". Follow the Instructions. When this is complete the Panel View will reboot automatically and should come up in normal operation mode. This completes the uploading and downloading of Panel View Software.

## Remote DH+ Addressing

### Purpose

This allows an OEM to connect a DH+ link to the AB OL blenders and communicate data and set points. The blender can remotely be controlled as the OEM designs his custom screens. The following are the AB DH+ addressing for all available data. The Node Address for the SLC500 defaults to 10, the Node Address for the PanelViews defaults to 11. To change these addresses go online to the unit and modify these settings at the unit. The original code that comes from AEC/HydReclaim will not be set up for the OEM's custom addresses and must be modified by the OEM or customer.

### Addresses and Explanation of use

Machine Name — ST99:0.2 — Read/Write — Name of machine (example: "Ext 1")

Blender Units — N11:0/0 — Read/Write — Maintained — 0 is metric, 1 is standard

Blender Mode — N11:2/0 — Read/Write — Maintained — 0 is set when the blender is stopped, 1 is set when the blender is running.

Blender Alarm Active — 0:2/15 — Read Only — 0 is no alarms, 1 is alarm active

Acknowledge and Clear all alarms — N11:31 — Read Only — write a momentary 1 to clear all alarms and turn off the alarm horn, this will delete the alarms so you should read each alarm bit to determine what the alarm is before giving the option to clear the alarms.

	Hopper 1	Hopper 2	Hopper 3	Hopper 4	Mass Flow Hopper
Reload too long	N11:11/0	N11:11/1	N11:11/2	N11:11/3	N/A
Out of Material	N11:9/0	N11:9/1	N11:9/2	N11:9/3	N/A
No Material Flow	N11:10/0	N11:10/1	N11:10/2	N11:10/3	N/A
Scale Exceeded	N11:6/1	N11:6/2	N11:6/3	N11:6/4	N11:6/9
Loadcell Failure	N11:12/0	N11:12/1	N11:12/2	N11:12/3	N11:12/8
Motor Failure	N11:13/0	N11:13/1	N11:13/2	N11:13/3	N/A

Loading Enabled — B3:3/6 — Read/Write — Maintained — 0 is set to disable the loading of the weigh hoppers, 1 is set to enable the loading of the hoppers.

Hopper Data — Read Only, see below for addresses

	Hopper 1	Hopper 2	Hopper 3	Hopper 4	Mass Flow
Hopper is Loading	N10:11/0	N10:11/1	N10:11/2	N10:11/3	N/A
Hopper Weight	F9:1	F9:2	F9:3	F9:4	F9:10
Hopper % Full	F9:221	F9:222	F9:223	F9:224	F9:41
Motor Speed in %	F9:21	F9:22	F9:23	F9:24	N/A

## Remote DH+ Addressing

**Blender Total Rate** — F9:90 — Read Only — total rate that all the augers are running at, this is not the extrusion rate

**Extrusion Rate** — F25:1 — Read Only — the rate at which the extruder is taking away the blended material

**Stable Extrusion Flag** — B3:3/1 — Read Only — this flag is set once the blender accurately learns the extrusion rate. This flag should be read before using the “Extrusion Rate” data described above, if this flag is set to “0” then the OEM should use previous relationships for extrusion rate per RPM. This relationship can be developed using the “Stable Extrusion Flag”, “Extrusion Rate”, and the current extruder RPM. Once this relationship has been developed it should be stored by the OEM.

**Extruder RPM** — F9:29 — Read Only — available only if “Extruder RPM Voltage Reference” is enabled (the customer supplies the blender with a 0-10 Volt/4-20 mA signal that references drive speed, usually this can be taken from the drive itself and is recommended if the customer plans to use the “Extrusion Rate” information for extrusion control calculations.

**Extruder RPM Voltage Reference** — N11:0/1 — Read/Write — Maintained — when set to 1 this instructs the blender to use a 0-10V/4-20 mA signal to calculate extruder RPM. This is then used by the blender to develop and buffer the relationship between extrusion rate and extruder RPM. This should always be used when the customer is planning on using the “Extrusion Rate” information for extrusion control calculations.

**Maximum Extruder RPM** — F9:180 — Read/Write — only used if the “Extruder RPM Voltage Reference” is enabled, use this to adjust the displayed “Extruder RPM” value of the blender. If the displayed RPM is too low then increase this value, if it’s too high then decrease this value.

**User Password** — N11:35 — Read/Write — only used when the operator is accessing the “Calibration/Diagnostics” page from the Panel View. If set to “0” then no password will be necessary for the operator to calibrate the blender from the Panel View.

**Handling the blender recipe** — the current blender recipe that is running in the blender can be read without any special procedure. In order for the OEM to properly change the recipe remotely they will need to complete a procedure in the proper order and examine certain addresses to ensure that the recipe that the operator enters is accepted. This procedure is already handled at the Panel View, but if you wish for the operators to be able to enter in the blender recipes at the OEM screen then this procedure must be followed.

### Reading the current running recipe (Read Only!)

	Hopper 1	Hopper 2	Hopper 3	Hopper 4
Set %	F9:91	F9:92	F9:93	F9:94
Actual %	F9:171	F9:172	F9:173	F9:174
Lowest Rate at which the blender can run the current recipe: F9:40				
Highest Rate at which the blender can run the current recipe: F9:39				



# Remote DH+ Addressing

## Writing the current running recipe

**Step 1:** Write all new recipe set percentages to the “new” recipe location  
Hopper 1– F101:0, Hopper 2– F102:0, Hopper 3– F103:0, Hopper 4– F104:0

**Step 2:** (optional) Read back in these same addresses to ensure that they made it to the correct place, this can be done simply by displaying in a different box these values for the operator to see.

**Step 3:** Read N11:2/15 to ensure that the recipe adds to “100”, this will be set if the new recipe does not equal 100, and therefore the new recipe will not be accepted until it does. Show the operators a message for this.

**Step 4:** Read B3:3/4 to see if the “New” recipe is ready for acceptance. Once this bit is set then give the operators a button to “Accept New Recipe”. If this bit is not set the operator should not be able to accept the new recipe.

**Step 5:** Write a “1” to B3:8/0 to accept and transfer the new recipe.

**Step 6:** Read B3:4/0 to see if the blender cannot run the recipe that you have transferred. If this bit is set then read the following addresses to determine why the recipe was not transferred.

	Hopper 1	Hopper 2	Hopper 3	Hopper 4
Cannot Achieve Low Rate	N11:8/0	N11:8/1	N11:8/2	N11:8/3
Cannot Achieve High Rate	N11:7/0	N11:7/1	N11:7/2	N11:7/3

**Step 7:** Be sure to continuously display the “Set %” as described before under “Hopper Data”. This will give the operators an understanding that the “New” recipe that they have entered was accepted and transferred.

The reason that a given recipe cannot be ran by the blender is that the blender is designed to run each motor within its designed range (3-98 % of motor speed). This ensures overall blending accuracy and performance, but is generally the most difficult topic for someone new to gravimetric blending to comprehend. Each hopper has a minimum throughput and a maximum throughput that is continuously updated. The following data in conjunction with the given recipe is used to calculate the “Blender Min Rate” and the “Blender Max Rate”. These values are related to material density, gear box ratio of the hopper, and the auger size of the hopper. If a different range is desired contact AEC/HydReclaim for help.

To examine the range for a given hopper first write the desired hopper number to N11:4  
Then the minimum throughput for that hopper can be read from F9:150  
Also the maximum throughput for that hopper can be read from F9:140

This concludes all remotely accessible DH+ addresses and integration